

Appl. No. : 09/851,261
Filed : May 8, 2001

REMARKS

Claims 1, 3, 7 and 10 have been amended to clarify the invention. Support for the amendments can be found throughout the specification and Fig. 1, for example. Claims 5 and 6 have been amended to correct informalities. The amendments do not constitute the addition of new matter to the application. Applicant respectfully requests entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

Rejection under 35 U.S.C. § 103

Claims 1-3, 7, 9 and 10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 04-055078A (JP '078) and further in view of JP 2000-042769 (JP '769) based on the same reasons as described in the previous Office action. Claims 4-6, 8 and 11 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over JP '078 and further in view of US 5,938,446 (Anderson) based on the same reasons as described in the previous Office action.

In the Response to Arguments of the Office action, the Examiner has asserted that Applicant's argument regarding to the semiconductor lasers are disposed to measure the welding state is unclear, since the examiner's interpretation of the claimed language indicates that the welding line is detected initially and then based on the image, a signal is transferred to the welding head for welding, as claimed in claim 3 and 10.

Claims 1, 3, 7 and 10 have been amended for clearly distinguishing from the prior art and arguing in commensurate with the scope of the claims. Applicant respectfully traverses the above rejections as follows:

The Examiner asserts that JP '078 discloses plural semiconductor lasers for measuring a welding state. However, the Examiner's understanding is not correct. As is seen in the figure and abstract of JP '078, the semiconductor lasers are employed to detect a welding seam of workpieces to be welded by irradiating laser beams onto the workpieces. That is, the semiconductor lasers 28, 33 are disposed upstream of a welding head 23 and used to detect a welding seam 22 before the seam is welded (in other word, to detect the condition (positions) of the workpieces to be welded before the welding process). It is impossible to measure a welding state because welding has not occurred. JP '078 simply teaches positioning control of a welding head. In contrast, in the present invention as amended herein, the semiconductor lasers are

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disposed for measuring a welding state during or after a welding process. In Claim 1 as amended herein, a plurality of semiconductor lasers to oscillate a plurality of linear laser beams are configured to direct the plurality of the linear beams at the laser spot or a region already welded for measuring a welding state during or after a welding process

This significant feature is clearly distinguishable from the invention of JP '078. In an embodiment as shown in Fig. 1, a welding laser 6 is disposed between semiconductor lasers 2, 3, wherein a welding state and a welding line can be evaluated.

Further, JP '078 fails to disclose a CCD camera with a band-pass filter to pass through only linear laser beams from the semiconductor lasers.

JP '769 detects a welding state by using solely the welding laser beam. This is not for detecting a welding seam as taught by JP '078. In JP '769, a CCD camera may be used to receive a reflecting laser beam from the welding laser. Because of using the reflecting laser beam from the welding laser which is the only laser and much more powerful than semiconductor lasers, signal-processing systems are dissimilar to those using multiple semiconductor lasers separately from a welding laser. Please note that although the Examiner asserts that JP '769 discloses a band-pass filter to change into the voltage signal according to light receiving intensity with the photodiode and amplifier, that is not a function of a band pass filter and also that is not called a band pass filter in JP '769. Band pass filters used in JP '769 may be numerals 17 and 18. JP '769's band-pass filter is irrelevant to pass through only linear laser beams from semiconductor lasers. The welding state measuring method of the present invention is very different from that of JP '769.

A combination of JP '078 and JP '769 could not reasonably be accomplished because JP '078 detects a welding seam only, by using two semiconductor lasers separately from a welding laser, whereas JP '769 detects a welding state by using a single welding laser. The purposes of these systems are different and the mechanisms are different, and thus a combination of these could not reasonably be accomplished.

Further, even if these references are combined (i.e., JP '078 includes a CCD camera with a band-pass filter), JP '078 still cannot measure a welding state.

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Thus, the present invention could not be obvious over JP '078 in view of JP '769. Applicant respectfully requests withdrawal of this rejection.

Claims 1, 3, 7 and 10 are independent and the remaining claims are dependent ultimately on either one of them. As explained above, the dependent claims could not be obvious over the references, and thus, at least for this reason, the Examiner's rejection of Claims 4-6, 8 and 11 based on JP '078 in view of Anderson should be overcome. In fact, Anderson does not teach the above-explained features of the present invention.

CONCLUSION

In light of the Applicant's foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

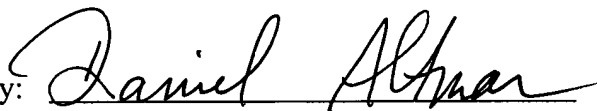
Please charge any fees to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: February 18, 2004

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